REMARKS

Claims 1-22 are pending. Claims 1, 13, 19 and 21 have been amended to further clarify the invention. Claims 20 and 22 have been amended to depend from claim 19 and 21, respectively. Claims 23 and 24 have been added.

The Office Action objected to the abstract of the application because of undue length. Accordingly, the abstract has been amended to not exceed 150 words, pursuant to 37 CFR § 1.72(b). No new matter has been added.

Claims 1-18 stand rejected under 35 U.S.C. 102(e) as being anticipated by Liebchen (US Pat. No. 6,738,859).

Claims 19-22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Liebchen (US Pat. No. 6,738,859).

Claims 1, 13, 19 and 21 have been amended to clarify that the generalized bilinear kernel includes at least one non-scalar effect due to the vector character of the electric field of the illumination energy from the illumination source. Claim 23 has been added to recite that non-scalar effects may include lens birefringence, tailored source polarizations, blurring imposed by optics, or blurring imposed by multiple reflections within a film stack. Support for at least one non-scalar effect due to the vector character of the electric field is provided throughout the specification, for example, at lines 9, page 50, through line 9, page 51. See also page 24, lines 5-9 (Equation 29), where the generalized bilinear kernel, $V(\vec{r}',\vec{r}'')$, is which is dependent on the source function $S(\vec{k}_s)$ and the impulse response function of the lens $\vec{h}$, and where $\vec{k}_s$ is the illumination polarization vector (see page 23, lines 9-15 and lines 19-23), and $\vec{h}$ represents the electric field distribution in the image plane due to illuminating the projection, and is referred to as a lens vector impulse response, as defined by Equation 30 on page 25. See also lines 19, page 26 (e.g. Equation 33) through line 1, page 27, providing support for the effects of vector diffraction, resist film stack, tailored source polarization. See also lines 17, page 28 (e.g. Equation 41) through line 8, page 29, for blurring imposed by the optics (and by multiple reflections within the film stack) using a generalized vector model (also accounting for the

contrast loss at high-NA that can occur with interfering vector fields). No new matter has been added.

Claim 24 has been added to recite that the generalized bilinear kernel comprises mask blur. Support for mask blur is provided, for example, at page 29, lines 4-8 and page 50, lines 26-27. No new matter has been added.

As understood, Liebchen discloses a method for simulating a projection lithography system using the Hopkins model (lines 67, col. 3 to line 1, col. 4). Note that Liebchen discloses that the Hopkins model treats the electric field forming the image typically as a scalar (col. 2, lines 24-25). Liebchen discloses a bilinear kernel (col. 7, lines 27-28), and such kernel represents a small matrix the efficiently approximates the TCC in the Hopkins model (see col. 4, lines 5-8 and lines 13-21; see also col. 13, lines 24-28). However, Liebchen does not contemplate a non-Hopkins model, and more particularly fails to disclose a forming a generalized bilinear kernel comprising an autocorrelation of the scalar source intensity distribution with a combination of the projection impulse response and the exposure response, wherein said generalized bilinear kernel comprises at least one non-scalar effect due to the vector character of the electric field of the illumination energy.

Liebchen also fails to disclose, teach or suggest a generalized bilinear kernel comprising mask blur, as recited in new claim 24.

As understood, Liebchen discloses calculating a vector based on an orthogonal maks projection of the parameters of the mask onto a basis set, and calculating a field intensity distribution using the kernel and the vector (col. 4, lines 36-39). As understood, the vectors of Liebchen are merely ordered sets of numbers that are used in calculations, specifically, calculating a vector b rather than being related to the vector character of the electric field. In addition, such vectors are computed after the kernel A[ij] is computed in step S404 (col. 4, lines 34-37; col. 7, lines 33-39; FIG. 4). Thus Liebchen does not disclose, teach or suggest a generalized bilinear kernel comprising at least one non-scalar effect due to the vector character

of the electric field of the illumination energy.

Thus, Applicants submit that claims 1-22 are patentably distinct from Liebchen, and respectfully request that these rejections be reconsidered and withdrawn.

In view of the foregoing, Applicants submit that claims 1-24 are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Applicants' undersigned attorney may be reached by telephone at (845) 894-6919. All correspondence should continue to be directed to the address listed below.

Respectfully submitted,

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